National Institute of Environmental Health Sciences

Revisiting the association between sea surface temperature and the epidemiology of fish poisoning in the South Pacific: reassessing the link between ciguatera and climate change

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Abstract:

The most detailed dataset of ciguatera intensity is that produced by the South Pacific Epidemiological and Health Information Service (SPEHIS) of the Secretariat of the Pacific Community. The SPEHIS fish poisoning database has been previously analysed yielding statistically significant correlations between the Southern Oscillation Index (SOI) and ciguatera case numbers in several countries raising concerns this affliction will increase as oceans warm. Mapping of the SPEHIS records and other data hints at ciguatera not only being restricted to warm waters but that the Indo-Pacific Warm Pool, a body of water that remains hot throughout much of the year, may inhibit ciguatera prevalence. A qualitative assessment of ciguatera intensity and sea surface temperature (SST) behaviour within the EEZ of selected South Pacific nations supported the notion that ciguatera intensity was highest when SST was between an upper and lower limit. Many more climate and SST indices beyond the SOI are now available, including some that measure the abovementioned phenomenon of oceanic warm pools. Statistically significant, positive and negative cross-correlations were obtained between time series of annual ciguatera case rates from the SPEHIS dataset and the Pacific Warm Pool Index and several ENSO related indices which had been lagged for up to 2 years before the ciguatera time series. This further supports the possibility that when considering the impact of climate change on ciguatera, one has to consider two thresholds, namely waters that remain warm enough for a long enough period can lead to ciguatera and that extended periods where the water remains too hot may depress ciguatera case rates. Such a model would complicate projections of the effects of climate change upon ciguatera beyond that of a simple relationship where increased SST may cause more ciguatera.

Source: http://dx.doi.org/10.1016/j.toxicon.2009.08.011

Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Researcher

Exposure : ☑

weather or climate related pathway by which climate change affects health

Food/Water Quality, Temperature

Food/Water Quality: Biotoxin/Algal Bloom

Geographic Feature: ☑

resource focuses on specific type of geography

Ocean/Coastal

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Other Health Impact

Other Health Impact: Ciguatera poisoning

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content